errors, but is a need of incorporating a more accurate algorithm for patients in which low density regions are involved. In fact we note a discrepancy between measured and planned dose in thoracic cases. It is due to the DC Pencil beam algorithm of dose reconstruction, that over-estimates dose in heterogeneous area.

Teaching Lecture: Organ sparing: A valid option in the treatment of bladder cancer

SP-0582

Organ sparing: A valid option in the treatment of bladder cancer

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In the framework of multimodality approaches combined radiochemotherapy for selected patients with bladder cancer already is accepted as alternative to radical cystectomy. Overall survival rates after five and ten years are comparable. The multimodality bladder preservation approach will be successful only in institutions with a close cooperation between urooncological and radiooncological partners. Combined radiochemotherapy is superior to radiation alone and therefore in a curative setting the use of simultaneous chemotherapy is mandatory. Further developments, e.g. brachytherapy, additional regional hyperthermia, the optimization of simultaneous chemotherapy, and the use of predictive biomarkers may further increase the results after organ-preserving multimodality treatment for patients with bladder cancer.

Teaching Lecture: ESTRO: what's in it for me?

SP-0583

ESTRO: What's in it for me?

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Teaching Lecture: High throughput biological screens and their translation to new targets

SP-0584

High throughput biological screens and their translation to new targets

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The therapeutic window of radiotherapy could be improved if tumor cells could be selectively rendered more sensitive to radiation. Such a strategy depends upon exploiting tumor specific targets, some of which, such as hypoxia in the microenvironment are well known, but many of which remain to be identified. The colony forming assay (CFA) is the 'gold standard' method for assessing intrinsic radiosensitivity in vitro. We have developed a technique to perform high-throughput CFAs in 96 well plates and have recently completed siRNA screens of a selected DNA repair library and of approximately 10,000 additional genes, of which the 793 gene 'kinase' section of the library has been examined in detail. The screens used a ranked-product analysis to identify the top hits. On the basis of the top candidate genes identified by the primary screen, a secondary library was then screened on multiple occasions. This work identified several genes such as ATM, ATR, DNA-PK and CHEK1, which are well known to play key roles in tumor cell radiosensitivity. In addition, we identified several novel genes whose depletion induced HeLa radiosensitisation in 6-well plate CFAs. These experiments were repeated with separate siRNAs to ensure these findings were not the result of off-target effects. Depletion of these genes appeared to cause radiosensitisation in several other tumor cell lines as well. We are currently investigating the effects of several of these genes in greater detail. Ongoing work will be presented that clarifies the effects of gene knockdown on radio- in several tumor and normal tissue lines. The mechanism by which this knockdown causes these effects will also be presented for some of the targets. Tumor hypoxia is probably the major determinant of clinical outcome other than intrinsic radiosensitivity. Most work so far has concentrated on vascular effects in oxygen delivery as a determinant of this, but in fact oxygen consumption by the tumor cells is also a determinant of tumor oxygen concentration. We have developed screens for oxygen consumption. We used both the Pharmakon 1600 and Oncology drug set libraries for the screening. Our primary screen identified 100 compounds that reduced oxygen consumption (OCR) without significantly affecting cell death in FaDu hypopharyngeal cells. A secondary screen identified 50 compounds that reduced oxygen consumption (OCR) without significantly affecting cell death in either FaDu hypopharyngeal cells or MRC5 lung fibroblasts. The results of these "microenvironmental" screens will also be discussed.

Teaching Lecture: Application of Monte Carlo methods in radiation treatment planning

SP-0585

Application of Monte Carlo methods in radiation treatment planning

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The availability of Monte Carlo (MC)-based codes optimized for photon and electron beams in patient-specific geometries has lead to the development of several different MC-based dose calculation systems for radiotherapy treatment planning. MC-based photon beam dose calculations today are performed within minutes in the routine clinical setting. As MC-based planning systems become more widely utilized in the clinic, it is critical that paradigms and approaches for clinical commissioning and implementation of these systems be formulated and discussed. This lecture will focus on such strategies in the context of MC calculations for external photon and electron beam radiotherapy. The following topics will be covered: (a) Overview of the MC method for radiotherapy photon beam simulation; (b) Review of the methods used for characterization of the linear accelerator (linac) and patient simulation; (c) Techniques for commissioning and experimental verification of MC-based dose calculation systems, and associated challenges; (d) Tools for facilitating MC-based treatment planning in the clinical setting, e.g. methods for viewing of isodose plans with their combined statistical uncertainty distributions; (e) Issues specific to MC-based electron beam dose calculations.